



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,906	07/16/2001	Takeshi Fukada	740756-2332	4431

22204 7590 07/30/2003

NIXON PEABODY, LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

MALSAWMA, LALRINFAMKIM HMAR

ART UNIT	PAPER NUMBER
----------	--------------

2825

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/904,906

Applicant(s)

FUKADA ET AL.

Examiner

Lex Malsawma

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/311,275.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-8 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. (5,192,644, hereinafter, "**Ohta**") in view of Gladfelter et al. (4,832,986, hereinafter, "**Gladfelter**").

Regarding Claims 1-8 and 17-20:

Ohta discloses a substrate assembly comprising:

a glass substrate 1 (Fig. 1); and

a insulating film 2a provided over said substrate and comprising aluminum nitride (Fig. 1 and col. 3, lines 40-44).

Ohta **lacks** specifically disclosing that the aluminum nitride film comprises oxygen; however, note Ohta specifies that the aluminum nitride film is formed by a CVD process. Gladfelter **teaches** that an aluminum nitride film formed by a CVD process will comprise oxygen at a concentration of about 2 atomic weight percent (note col. 5, lines 64 to col. 6, line 23, especially col. 6, lines 15-16). It is important to note Gladfelter discloses that oxygen is “always present” in the aluminum nitride film deposited by CVD (note col. 5, lines 67-68; and col. 6, line 22). It would have been obvious to one of ordinary skill in the art to modify Ohta by specifically reciting that the aluminum nitride film comprises oxygen and that the substrate is used for a display because Gladfelter teaches that an aluminum nitride film formed by CVD (as in the case disclosed by Ohta) will comprise oxygen, i.e., given Gladfelter’s teaching, one of ordinary skill in the art would have realized that Ohta’s aluminum nitride film would comprise oxygen, even if a dedicated process is performed to specifically reduce/remove oxygen from the aluminum nitride film (note Gladfelter, col. 6, lines 14-24). Note that Gladfelter discloses (in col. 1, lines 5-13) it was generally well known in the art to utilize an aluminum-nitride substrate assembly for optical or optoelectronic devices, therefore, specifically utilizing the substrate assembly for a display is also held obvious over the cited references.

4. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ohta** (in view of **Gladfelter**) as applied to Claims 1-4, and further in view of **Knudsen** (5,283,214).

Regarding Claim 9-12:

Ohta (in view of Gladfelter) **lacks** the aluminum nitride film having a thermal conductivity of 200 W/mK or more. Knudsen is **cited primarily to show** that incorporating an

aluminum nitride film having a thermal conductivity of 200 W/mK or more is common in the art. Knudsen discloses the removal of heat from critical circuit components through the circuit substrate is directly dependent on the thermal conductivity of the substrate, and as circuit densities increase, efficient thermal management becomes increasingly important (note col. 1, lines 6-11). Knudsen discloses the theoretical value for thermal conductivity of aluminum nitride is 320 W/mK (col. 2, lines 37-38) and thermal conductivities in the range of 200-250 W/mK have been reported/acquired (col. 2, lines 22, 35, and 51). It would have been obvious to one of ordinary skill in the art to modify Ohta by specifying a thermal conductivity of 200 W/mK or more because Knudsen teaches it is desirable to increase the thermal conductivity of an aluminum nitride film to a level approaching its theoretical value (320 W/mK) such that efficient thermal management can be achieved even as circuit densities increase, and Knudsen shows that thermal conductivities of 200 W/mK or more have been achieved.

5. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ohta** (in view of **Gladfelter**) as applied to Claims 1-4, and further in view of Fujita et al. (5,042,917; hereinafter, "**Fujita**").

Regarding Claims 13-16:

Ohta (in view of Gladfelter) **lacks** the aluminum nitride film having a thickness of 500 Å to 3µm. Note that Ohta discloses a thickness of about 330-345 Å when the film is specifically utilized in an optical memory device (col. 4, lines 60-62). Fujita **teaches** a substrate assembly, comprising an aluminum nitride film 5 (col. 7, lines 1-15), used specifically for a display, wherein the film 5 has a thickness of about 1800 Å. It would have been obvious to one of

ordinary skill in the art to modify Ohta by incorporating a thickness of 500 Å to 3µm because such a modification to the substrate assembly would provide a suitable substrate for a display.

Remarks

6. Applicants' remarks/arguments have been carefully reviewed and they are generally persuasive primarily because the applied references do not fairly suggest a film provided over a substrate and comprising aluminum nitride and oxygen. Accordingly, the previous rejections have been withdrawn; however, new references have been cited and all pending claims stand rejected.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The references listed on the attached "Notice of References Cited" (not specifically cited above) have been cited to show aluminum-nitride films comprising oxygen similar to the aluminum-nitride film of the current invention.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lex Malsawma whose telephone number is 703-306-5986.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 703-308-1323. The fax phone numbers for the

Art Unit: 2825

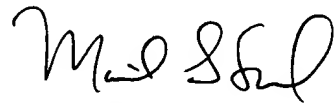
organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Lex Malsawma



July 17, 2003



MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800